

10/305,253

Set	Items	Description
S1	299266	DATABASE? OR DATA()BASE? OR DATATABLE? OR DATA()TABLE? OR - DASD OR DATA?(3N) (INDEX? OR INDICES OR ROW OR ROWS OR RECORD? OR FILE? OR PAGESET? OR PAGE() (SET OR SETS))
S2	13126	(ROW OR ROWS OR TABLE? OR INDEX? OR INDICES OR ROWSET? OR - ROW() (SET OR SETS)) (10N) (FILEOBJECT? OR FILE()OBJECT? OR OBJE- CT?)
S3	164883	(KEYVALUE? OR KEY()VALUE? OR VALUE? OR CHARACTERISTIC? OR - ATTRIBUT? OR QUALIT?) (10N) (RANGE? OR SPECTR? OR TYPE? OR SCOP- E? OR PARAMET?)
S4	112760	(DESIGNAT? OR ASSIGN? OR DISTRIBUT? OR ALLOCAT? OR FORMAT? OR DIVY? OR DISPENS? OR ALLOT? OR REORGANI? OR RE()ORGANI?) (7- N) (SPACE? OR AREA? OR SEGMENT? OR SECTION? OR SECTOR? OR TABL- ESPACE? OR FREESPACE?)
S5	1478199	DIFFERENT? OR NONUNIFORM? OR (NON OR "NOT") () (EVEN?? OR UN- IFORM? OR ALIKE) OR DISSIMILAR? OR DISIMILAR? OR INCONSISTENT? OR HETER? OR UNEVEN?
S6	1213975	IC=G06F?
S7	896275	MC=T01?
S8	30643	S1:S2 AND S4:S5
S9	776	S8 AND S3
S10	413	S9 AND S6:S7
S11	1	S8 AND S1 AND S2 AND S4(10N)S5
S12	141	S8 AND S1:S2 AND S4(10N)S5
S13	2	S12 AND S9:S10
S14	3	S11 OR S13
S15	138	S12 NOT (S13:S14)
S16	819573	PR=2002:2005
S17	127	S15 NOT S16
S18	127	IDPAT (sorted in duplicate/non-duplicate order)

? show files  
File 347:JAPIO Nov 1976-2005/Feb(Updated 050606)  
(c) 2005 JPO & JAPIO  
File 350:Derwent WPIX 1963-2005/UD,UM &UP=200539  
(c) 2005 Thomson Derwent  
?

Set	Items	Description
S1	299266	DATABASE? OR DATA()BASE? OR DATATABLE? OR DATA()TABLE? OR - DASD OR DATA?(3N)(INDEX? OR INDICES OR ROW OR ROWS OR RECORD? OR FILE? OR PAGESET? OR PAGE() (SET OR SETS))
S2	13126	(ROW OR ROWS OR TABLE? OR INDEX? OR INDICES OR ROWSET? OR - ROW() (SET OR SETS)) (10N) (FILEOBJECT? OR FILE()OBJECT? OR OBJE- CT?)
S3	164883	(KEYVALUE? OR KEY()VALUE? OR VALUE? OR CHARACTERISTIC? OR - ATTRIBUT? OR QUALIT?) (10N) (RANGE? OR SPECTR? OR TYPE? OR SCOP- E? OR PARAMET?)
S4	112760	(DESIGNAT? OR ASSIGN? OR DISTRIBUT? OR ALLOCAT? OR FORMAT? OR DIVY? OR DISPENS? OR ALLOT? OR REORGANI? OR RE()ORGANI?) (7- N) (SPACE? OR AREA? OR SEGMENT? OR SECTION? OR SECTOR? OR TABL- ESPACE? OR FREESPACE?)
S5	1478199	DIFFERENT? OR NONUNIFORM? OR (NON OR "NOT") () (EVEN?? OR UN- IFORM? OR ALIKE) OR DISSIMILAR? OR DISIMILAR? OR INCONSISTENT? OR HETER? OR UNEVEN?
S6	1213975	IC=G06F?
S7	896275	MC=T01?
S8	30643	S1:S2 AND S4:S5
S9	776	S8 AND S3
S10	413	S9 AND S6:S7
S11	1	S8 AND S1 AND S2 AND S4(10N)S5
S12	141	S8 AND S1:S2 AND S4(10N)S5
S13	2	S12 AND S9:S10
S14	3	S11 OR S13
S15	138	S12 NOT (S13:S14)
S16	819573	PR=2002:2005
S17	127	S15 NOT S16
S18	127	IDPAT (sorted in duplicate/non-duplicate order)
S19	55	S10 AND S5/TI
S20	55	S19 NOT S17
S21	55	IDPAT (sorted in duplicate/non-duplicate order)
? pause		
?		

SUPPLEMENTAL

STRATEGY

18/3,K/3 (Item 3 from file: 350)  
DIALOG(R)File 350:Derwent WPIX  
(c) 2005 Thomson Derwent. All rts. reserv.

009206178 \*\*Image available\*\*  
WPI Acc No: 1992-333599/199241  
XRPX Acc No: N92-254634

**Data recording medium for sharing data on optical disc in ISO and DC format - has address unit with integer multiples which correspond to respective sector capacities of formats with different sector size**

Patent Assignee: SONY CORP (SONY )  
Inventor: SAK Y; SAKO Y

Number of Countries: 005 Number of Patents: 006

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
EP 507341	A2	19921007	EP 92105829	A	19920403	199241 B
US 5327406	A	19940705	US 92862453	A	19920402	199426
EP 507341	A3	19931222	EP 92105829	A	19920403	199515
EP 507341	B1	19960619	EP 92105829	A	19920403	199629
DE 69211591	E	19960725	DE 611591	A	19920403	199635
			EP 92105829	A	19920403	
JP 3256981	B2	20020218	JP 91100385	A	19910405	200215

Priority Applications (No Type Date): JP 91100385 A 19910405

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
EP 507341	A2	E	8	G11B-020/12	
				Designated States (Regional):	DE FR GB
US 5327406	A		7	G11B-007/00	
EP 507341	A3			G11B-020/12	
EP 507341	B1	E	9	G11B-020/12	
				Designated States (Regional):	DE FR GB
DE 69211591	E			G11B-020/12	Based on patent EP 507341
JP 3256981	B2		4	G11B-020/12	Previous Publ. patent JP 4307472

**Data recording medium for sharing data on optical disc in ISO and DC format...**

...has address unit with integer multiples which correspond to respective sector capacities of formats with different sector size

...Abstract (Basic): The data recording medium is capable of recording data of a first data format in which one sector comprises a first data amount and of a second format in which one sector comprises a second data amount. One of the common divisors of both data amounts is...

...User data of one sector of the first data format is of units of 512 bytes. User data of the second data format corresponds to...

...ADVANTAGE - Capable of setting sectors respectively in accordance with different kinds of formats .

...Abstract (Equivalent): A data recording medium capable of recording data of a first data format in which each sector has a size corresponding to a first data amount and data of a second data format in which each sector has a size corresponding to a second data amount different from said first data amount, wherein a plurality of addressable data units (Aa;Ab;Ac) are provided on said recording

medium, each addressable **data** unit having a size corresponding to a third data amount equal to a common divisor...

...of said second data amount or a slightly greater amount, and an address is preliminarily **recorded** for each addressable **data** unit so that each **sector** according to the first **data** format can be **recorded** in a first integer number of addressable data units, and each **sector** according to the second **data** format can be **recorded** in a second integer number of data addressable units...

...Abstract (Equivalent): The **data recording** medium is capable of **recording data** of one **data format** in which one **sector** comprises one data amt. and data of a second data **format** in which one **sector** comprises a second data amount. A common divisor of the two data amts. is selected...

...unit and an address is preliminarily recorded for each address unit. User data of one **sector** of the first data **format** is 512 bytes. User data of one **sector** of the second data **format** corresponds to data of 98 frames of a compact disc...

...information is preliminarily recorded for each segment which is obtd. by dividing data of one **sector** in data **format**. A common divisor of the two data amts. which is an integer multiple of data...

...USE/ADVANTAGE - For CD-ROM and CD-I use. Allows recording of two **formats** with **different sector** size on same disk...

18/3,K/33 (Item 33 from file: 350)  
DIALOG(R)File 350:Derwent WPIX  
(c) 2005 Thomson Derwent. All rts. reserv.

013945051 \*\*Image available\*\*  
WPI Acc No: 2001-429264/200146  
XRPX Acc No: N01-318707

**Data processing system for computer network, has controller which regulates recording such that cache data is distributed in various buffer areas , based on set address**

Patent Assignee: HITACHI LTD (HITA )  
Inventor: WANG H; CHOPRA R; TSONG J; YOSHIOKA S  
Number of Countries: 004 Number of Patents: 004  
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
JP 2001147854	A	20010529	JP 2000276522	A	20000912	200146 B
KR 2001050796	A	20010625	KR 200057697	A	20000930	200172
US 6496905	B1	20021217	US 99410555	A	19991001	200307
TW 505862	A	20021011	TW 2000120412	A	20000930	200341

Priority Applications (No Type Date): US 99410555 A 19991001

Patent Details:

Patent No	Kind	Lan Pg	Main IPC	Filing Notes
JP 2001147854	A	11	G06F-012/02	
KR 2001050796	A		G06F-013/28	
US 6496905	B1		G06F-012/00	
TW 505862	A		G06F-013/36	

**Data processing system for computer network, has controller which regulates recording such that cache data is distributed in various buffer areas , based on set address**

Abstract (Basic):

... areas of write-in buffer controller regulates data storage, such that data from cache is **distributed in different areas** of buffer using addresses.

... Reduces frequency of **data recording** by utilizing the memory capacity effectively...

18/3,K/70 (Item 70 from file: 350)  
DIALOG(R)File 350:Derwent WPIX  
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009335394 \*\*Image available\*\*  
WPI Acc No: 1993-028857/199304  
XRPX Acc No: N93-022053

Recording or reproducing data on basis of command over SCSI - has  
partition command sent from host to controller to divide data tracks into  
logical partitions to designate the sector size in each partition

Patent Assignee: CANON KK (CANO )  
Inventor: HOSOYA H; KAISHA K  
Number of Countries: 006 Number of Patents: 005  
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
EP 524809	A2	19930127	EP 92306702	A	19920722	199304 B
EP 524809	A3	19930602	EP 92306702	A	19920722	199404
US 5461719	A	19951024	US 92914588	A	19920720	199548
EP 524809	B1	19981007	EP 92306702	A	19920722	199844
DE 69227219	E	19981112	DE 627219	A	19920722	199851
			EP 92306702	A	19920722	

Priority Applications (No Type Date): JP 91205659 A 19910723  
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
EP 524809	A2	E	17	G06F-003/06	
				Designated States (Regional):	DE FR GB IT NL
US 5461719	A		14	G06F-013/12	
EP 524809	B1	E		G06F-003/06	
				Designated States (Regional):	DE FR GB IT NL
DE 69227219	E			G06F-003/06	Based on patent EP 524809
EP 524809	A3			G06F-003/06	

Recording or reproducing data on basis of command over SCSI...

...partition command sent from host to controller to divide data tracks  
into logical partitions to designate the sector size in each  
partition

...Abstract (Basic): The method of **recording** or reproducing data  
involves the host computer sending a partition command to the  
recording/reproducing apparatus controller over the SCSI-bus so that  
the data tracks are divided into logical partitions to **designate** the  
**sector** size to be used in each partition. The parameters for partition  
division and sector size...

...the SCSI-bus. The controller controls the recording/reproducing appts.  
to effect either one of **recording data** on or reproducing data from  
the data track in the partition designated by the select...

...ADVANTAGE - Can effectively use information capacity of recording medium  
by allowing sectors of **different** data capacities to mixedly exist...

...Abstract (Equivalent): A method of performing either the **recording** or  
reproduction of **data** by using an information processing system that  
includes a recording/reproducing apparatus for executing at least one  
of the **recording** of **data** on and reproduction of **data** from a  
**recording** medium on which a plurality of data tracks are provided, a  
controller to control the...

...command signal to divide the data tracks into a plurality of logical

partitions and to **designate** a **sector** size which is used in each of the partitions from the host computer to the controller through the small computer interface, wherein each of the partitions includes a **different** number of data tracks and the **designated sector** sizes are also **different** ;

...

...information recording/reproducing apparatus by the controller so as to perform either one of the **recording** of the **data** to the data track and reproduction of the data from the data track of the

18/3,K/103 (Item 103 from file: 347)  
DIALOG(R)File 347:JAPIO  
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06435564 \*\*Image available\*\*  
STORAGE DEVICE OF MULTIMEDIA INFORMATION AND STORAGE METHOD APPLIED TO  
STORAGE DEVICE

PUB. NO.: 2000-021131 [JP 2000021131 A]  
PUBLISHED: January 21, 2000 (20000121)  
INVENTOR(s): ITO SEIGO  
APPLICANT(s): TOSHIBA CORP  
APPL. NO.: 10-199527 [JP 98199527]  
FILED: June 30, 1998 (19980630)

ABSTRACT

... addition to such continuous information (stream information) as image information, diversified information such as computer **data** is **recorded** in a medium 10 by the recording method of a recording/reproducing device. The device has a management table 21 for controlling the **assignment** of a plurality of extents (a recording **area** with a **different** data size) on the medium 10. A CPU 20 alternately and relatively allocates minimum and...



18/3,K/115 (Item 115 from file: 347)  
DIALOG(R)File 347:JAPIO  
(c) 2005 JPO & JAPIO. All rts. reserv.

03840761 \*\*Image available\*\*  
DATA RECORDING METHOD

PUB. NO.: 04-205861 [JP 4205861 A]  
PUBLISHED: July 28, 1992 (19920728)  
INVENTOR(s): MIKAMO NOBORU  
APPLICANT(s): OLYMPUS OPTICAL CO LTD [000037] (A Japanese Company or  
Corporation), JP (Japan)  
APPL. NO.: 02-337605 [JP 90337605]  
FILED: November 29, 1990 (19901129)  
JOURNAL: Section: P, Section No. 1453, Vol. 16, No. 551, Pg. 11,  
November 20, 1992 (19921120)

DATA RECORDING METHOD

#### ABSTRACT

PURPOSE: To efficiently **record** a large-capacity **data** on an optical card by a method wherein, when the size of a final block is not proper as a format for recording use, a **format** whose size per **sector** is **different** from the **format** is used and the final block is recorded...

...A controller 30 selects a track format on an optical card 1 on which a **data** is **recorded** and reproduced. A format selection signal 29 which indicates the kind of a track **format** is output to a **sector** position detection circuit 27. That is to say, divided **data** is **recorded** by using a first format, the divided data on a final block is recorded by...

... data is set. Thereby, the recording region can be utilized efficiently, and a large-capacity **data** can be **recorded** efficiently.

18/3,K/116 (Item 116 from file: 347)

DIALOG(R)File 347:JAPIO

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03797160 \*\*Image available\*\*

**DATA RECORDING METHOD**

PUB. NO.: 04-162260 [JP 4162260 A]

PUBLISHED: June 05, 1992 (19920605)

INVENTOR(s): MIKAMO NOBORU

APPLICANT(s): OLYMPUS OPTICAL CO LTD [000037] (A Japanese Company or Corporation), JP (Japan)

APPL. NO.: 02-285722 [JP 90285722]

FILED: October 25, 1990 (19901025)

JOURNAL: Section: P, Section No. 1426, Vol. 16, No. 457, Pg. 145, September 22, 1992 (19920922)

**DATA RECORDING METHOD**

**ABSTRACT**

PURPOSE: To write a large amount of data without reducing the **recording** area of real **data** by **recording** chain information following a **different** **format** having a **sector** size corresponding to a blank area

...

... writing is performed on the first and second tracks having a plurality of sectors of **different** sizes, such as ID section 5a and 5b, a data section 7a, blank area 7b...

...second track is recorded in at least one sector of the first track after the **data** are **recorded** in the sector of the second track. Accordingly, the blank area 7b which has not been used for **data** **recording** due to a difference in format can be used effectively. Therefore, a large amount of data can be written without reducing the **recording** area of real **data**.

18/3,K/125 (Item 125 from file: 347)

DIALOG(R)File 347:JAPIO

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01544275 \*\*Image available\*\*

DATA RECORDING SYSTEM

PUB. NO.: 60-022775 [JP 60022775 A]

PUBLISHED: February 05, 1985 (19850205)

INVENTOR(s): MASUYAMA YASUHIRO

APPLICANT(s): NEC CORP [000423] (A Japanese Company or Corporation), JP  
(Japan)

APPL. NO.: 58-131427 [JP 83131427]

FILED: July 19, 1983 (19830719)

JOURNAL: Section: P, Section No. 365, Vol. 09, No. 144, Pg. 81, June  
19, 1985 (19850619)

DATA RECORDING SYSTEM

ABSTRACT

...reduction of effective memory capacity for a rotary data memory having a fixed length type **format** by providing a **sector** having **different** length from other sectors at a place immediately after an index point and using this...

... N. For example, the number of record bytes of a track, the number of normal **data record** sectors, the length of the sector 0 and sectors 1-32 are set at 20...

20/3,K/26 (Item 25 from file: 350)  
DIALOG(R)File 350:Derwent WPIX  
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014264171 \*\*Image available\*\*  
WPI Acc No: 2002-084869/200212  
XRPX Acc No: N02-063142

Data object generation and matching method for human resource industry,  
involves storing data objects of different types that are generated and  
selected by user in same database

Patent Assignee: SMITH G C (SMIT-I)

Inventor: SMITH G C

Number of Countries: 002 Number of Patents: 002

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
GB 2362004	A	20011107	GB 20019540	A	20010418	200212 B
US 6701313	B1	20040302	US 2000583718	A	20000530	200417

Priority Applications (No Type Date): GB 20009750 A 20000419

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
GB 2362004	A		54	G06F-017/30	
US 6701313	B1			G06F-017/30	

Data object generation and matching method for human resource industry,  
involves storing data objects of different types that are generated and  
selected by user in same database

Abstract (Basic):

... Several primary **type** data objects comprising pre-selected  
**attributes** of classification categories, are prestored in a **database**  
. The classification categories are displayed to user for selection of  
**attributes**. The selected **attributes** are stored in the form of  
secondary **type** data objects in the **database**. The data objects of  
respective **types** which have predetermined number of common  
**attributes** are matched.

... Enables simple machine matching using **database** storing data  
objects of **different** types, thus reducing burden of job seeker and  
job provider...

...Title Terms: **DATABASE**

International Patent Class (Main): **G06F-017/30**

Manual Codes (EPI/S-X): **T01-J05A2B** ...

... **T01-J05B1** ...

... **T01-S03**

20/3,K/27 (Item 26 from file: 350)  
DIALOG(R)File 350:Derwent WPIX  
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014179050 \*\*Image available\*\*  
WPI Acc No: 2001-663278/200176  
XRPX Acc No: N01-494191

Generic attribute database system for storing multiple items across  
different categories using attribute values associated with attribute  
map entries and by translating a value using the associated attribute  
type

Patent Assignee: EBAY INC (EBAY-N); WANG H B (WANG-I)

Inventor: WANG H B

Number of Countries: 095 Number of Patents: 006

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
WO 200182115	A1	20011101	WO 2001US13253	A	20010424	200176 B
AU 200157232	A	20011107	AU 200157232	A	20010424	200219
US 20030088566	A1	20030508	US 2000563069	A	20000424	200337
			US 2002319034	A	20021213	
US 6604107	B1	20030805	US 2000563069	A	20000424	200353
US 20040010506	A1	20040115	US 2000563069	A	20000424	200406
			US 2003600861	A	20030619	
US 6778993	B2	20040817	US 2000563069	A	20000424	200454
			US 2002319034	A	20021213	

Priority Applications (No Type Date): US 2000563069 A 20000424; US  
2002319034 A 20021213; US 2003600861 A 20030619

Patent Details:

Patent No Kind Lan Pg Main IPC Filing Notes

WO 200182115 A1 E 32 G06F-017/00

Designated States (National): AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA  
CH CN CO CR CU CZ DE DK DM DZ EE ES FI GB GD GE GH GM HR HU ID IL IN IS  
JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL  
PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG US UZ VN YU ZA ZW

Designated States (Regional): AT BE CH CY DE DK EA ES FI FR GB GH GM GR  
IE IT KE LS LU MC MW MZ NL OA PT SD SE SL SZ TR TZ UG ZW

AU 200157232	A	G06F-017/00	Based on patent WO 200182115
US 20030088566	A1	G06F-007/00	Cont of application US 2000563069
US 6604107	B1	G06F-017/00	
US 20040010506	A1	G06F-007/00	Cont of application US 2000563069
			Cont of patent US 6604107
US 6778993	B2	G06F-017/00	Cont of application US 2000563069
			Cont of patent US 6604107

Generic attribute database system for storing multiple items across  
different categories using attribute values associated with attribute  
map entries and by translating a value using the associated attribute  
type

Abstract (Basic):

... A database is maintained and accessed via a database engine  
server implementing and supporting an auction facility and the  
database includes a generic attribute table (202), an attribute  
validity table (204), an attribute value table...

...The generic table is a data structure that includes and defines all  
attributes across all different items of different categories in  
the database and the database is used in conjunction with tracking  
of different electronic commerce goods or consumer products.

... INDEPENDENT CLAIMS are included for a database method, for a

machine readable medium with instructions and for a commercial system  
...

...Providing generic attributes across multiple categories in a **database** .

...

...The drawing shows a **database**

...Title Terms: **DATABASE** ;

International Patent Class (Main): G06F-007/00 ...

... G06F-017/00

Manual Codes (EPI/S-X): **T01-J05B4A** ...

... **T01-J05B4M** ...

... **T01-S03**

20/3,K/28 (Item 27 from file: 350)  
DIALOG(R)File 350:Derwent WPIX  
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014103710 \*\*Image available\*\*  
WPI Acc No: 2001-587924/200166

**Method for exchanging different type of drawing data to  
object-relational type geographic information system**

Patent Assignee: KOREA TELECOM (KOTE-N); KT CORP (KTKT-N)

Inventor: CHOI Y S; KIM D W; KIM J H; KIM S T; YOON E I

Number of Countries: 001 Number of Patents: 002

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
KR 2001037981	A	20010515	KR 9945769	A	19991021	200166 B
KR 340031	B	20020612	KR 9945769	A	19991021	200279

Priority Applications (No Type Date): KR 9945769 A 19991021

Patent Details:

Patent No	Kind	Lan Pg	Main IPC	Filing Notes
KR 2001037981	A	1	G06T-017/40	
KR 340031	B		G06T-017/40	Previous Publ. patent KR 2001037981

**Method for exchanging different type of drawing data to  
object-relational type geographic information system**

Abstract (Basic):

... A method for exchanging **different** type of drawing data to  
object-relational type geographic information system(GIS) is provided  
to...

...by exchanging drawing data such as data exchange format(DXF) or  
shapefile to data of **data base** management system(DBMS) for  
object-relational type GIS like GEUS.

... The first stage is that initial environment is set up  
inputting(501) **database** name to be created at DBMS for  
object-relational type GIS and **file** name of drawing **data** to be  
exchanged. The second stage is that **attributes** having space data  
**type** defined in class and class reading through drawing **data file**  
to be exchanged is defined(503) at **database** of DBMS for  
object-relational type GIS. The third stage is that drawing **data  
file** to be exchanged is exchanged(506) into space data provided from  
DBMS for object-relational type GIS extracting space data, reading  
again drawing **data file** to be exchanged. and the exchanged space  
data is stored(507) at **database** of DBMS for object-relational type  
GIS. A recorder is provided to be able to...

Manual Codes (EPI/S-X): T01-J10C4

20/3,K/30 (Item 29 from file: 350)  
DIALOG(R)File 350:Derwent WPIX  
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014064688

WPI Acc No: 2001-548901/200161

Related WPI Acc No: 2000-578246; 2000-663929; 2001-535349; 2004-417188

XRPX Acc No: N01-407667

**Default list generation for assisting user of main frame system, involves generating program parameter 's list having default values in second version of program different from that of first version**

Patent Assignee: INT BUSINESS MACHINES CORP (IBMC )

Inventor: BLEIZEFFER T M; CHURCH N D; DEVINE K W; HUGHES V W; KILBURN B J; SHOUGH D E

Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 6182285	B1	20010130	US 9769628	P	19971215	200161 B
			US 9858173	A	19980410	

Priority Applications (No Type Date): US 9769628 P 19971215; US 9858173 A 19980410

Patent Details:

Patent No	Kind	Lan Pg	Main IPC	Filing Notes
US 6182285	B1	30	G06F-009/445	Provisional application US 9769628

**Default list generation for assisting user of main frame system, involves generating program parameter 's list having default values in second version of program different from that of first version**

Abstract (Basic):

... A program **parameter 's** list including **parameters** having default **values** in second version of DB2 program, which are **different** from default values in first version of program accepted by user, is generated. The generated...

... For generating default list for directing and assisting user through program procedure in main frame **database** sub system...

... Enables user to easily view **parameters** having new default **values** , by displaying the list with only those **parameters** where default **value** is changed from prior version of program. Allows user to import values from previous version of **database** system, specifying new function values, modifying options, generating jobs, running jobs and running samples, as...

... of program. Provides improved method and apparatus for checking integrity of catalog and directory of **databases** before task migration on **database** .

International Patent Class (Main): G06F-009/445

Manual Codes (EPI/S-X): T01-F01B ...

... T01-F05B



20/3,K/34 (Item 33 from file: 350)  
DIALOG(R)File 350:Derwent WPIX  
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013609417 \*\*Image available\*\*  
WPI Acc No: 2001-093625/200111  
XRPX Acc No: N01-071027

Database **management procedure where fields of different type , e.g. character or integer, can be stored with similar attributes rather than different ones as currently**

Patent Assignee: BULL SA (SELA )

Inventor: CAUBIT P

Number of Countries: 025 Number of Patents: 002

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
EP 1054332	A1	20001122	EP 2000401375	A	20000519	200111 B
FR 2793906	A1	20001124	FR 996353	A	19990519	200111

Priority Applications (No Type Date): FR 996353 A 19990519

Patent Details:

Patent No Kind Lan Pg Main IPC Filing Notes

EP 1054332 A1 F 14 G06F-017/30

Designated States (Regional): AL AT BE CH CY DE DK ES FI FR GB GR IE IT  
LI LT LU LV MC MK NL PT RO SE SI

FR 2793906 A1 G06F-017/00

Database **management procedure where fields of different type , e.g. character or integer, can be stored with similar attributes rather than different ones as currently**

Abstract (Basic):

... **Database** (4) comprises objects (5) with standard attributes (6) with the **database** able to be interrogated by an application, a user, etc. The objects (5) are characterized...

...internal structure of which enables the administration and definition of components (21) independent of the **database** .

... **Database** management in an object orientated computing environment...

... **Different** components or field **types** (character, integer, Boolean) can be stored with the same **attributes** , which is not possible with existing **database** management systems...

...Figure shows a schematic view of a **database** based on an X500 directory structure...

... **database** (4

Title Terms: **DATABASE** ;

International Patent Class (Main): **G06F-017/00** ...

... **G06F-017/30**

Manual Codes (EPI/S-X): **T01-F07** ...

... **T01-J05B4M**

20/3,K/41 (Item 40 from file: 350)  
DIALOG(R)File 350:Derwent WPIX  
(c) 2005 Thomson Derwent. All rts. reserv.

011558848 \*\*Image available\*\*  
WPI Acc No: 1997-535329/199749  
Related WPI Acc No: 1998-520710; 1998-609845  
XRPX Acc No: N97-445746

Dissimilar data record storage for user information - involves  
storing records as databank record comprising static fields in  
single table with dynamic fields storing differences in data types  
between fields and descriptor table categorising fields

Patent Assignee: STARFISH SOFTWARE INC (STAR-N)  
Inventor: FREUND G P; KAHN P R; LEE S  
Number of Countries: 001 Number of Patents: 001  
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 5682524	A	19971028	US 95451734	A	19950526	199749 B

Priority Applications (No Type Date): US 95451734 A 19950526

Patent Details:

Patent No	Kind	Lan Pg	Main IPC	Filing Notes
US 5682524	A	29	G06F-017/30	

Dissimilar data record storage for user information...  
...involves storing records as databank record comprising static  
fields in single table with dynamic fields storing differences in data  
types between...

...Abstract (Basic): The data record storage method involves creating a  
descriptor table storing an entry characterizing the data fields of  
each type of the data records. Each of the data records is stored  
as a databank record in a single database table. The databank  
table comprises a set of static fields storing information for  
characterizing each of the data records, regardless of the  
particular type of data fields which comprise a given record...

...fields, each logical field storing information from a data field of the  
at least one data record which is different from another of the  
data records, so that the databank table stores all the data  
records regardless of differences in types of data fields between  
individual ones of the data records. The descriptor table stores a  
default value for each type of data field...

...non-similar records in fashion not incurring substantial overhead or  
performance penalty while preserving traditional database  
functionality...

Title Terms: DISSIMILAR ;  
International Patent Class (Main): G06F-017/30  
Manual Codes (EPI/S-X): T01-J05B2B ...

... T01-J05B4M ...

... T01-J12D

20/3,K/42 (Item 41 from file: 350)  
DIALOG(R)File 350:Derwent WPIX  
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011269717 \*\*Image available\*\*  
WPI Acc No: 1997-247620/199723  
XRPX Acc No: N97-204128

Relational database storing method in different memory devices - by  
dividing database into data segments each corresponding to different  
range of values in selected database field, stores each data segment  
in different memory, each stored segments has stored index of  
corresponding data segment

Patent Assignee: FILETEK INC (FILE-N)  
Inventor: BREEDEN R E; BURGESS J G  
Number of Countries: 006 Number of Patents: 004  
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
EP 772139	A2	19970507	EP 96116913	A	19961021	199723 B
JP 9212528	A	19970815	JP 96291898	A	19961101	199743
US 5727197	A	19980310	US 95551493	A	19951101	199817
US 6049804	A	20000411	US 95551493	A	19951101	200025
			US 9836671	A	19980309	

Priority Applications (No Type Date): US 95551493 A 19951101; US 9836671 A  
19980309

Patent Details:

Patent No	Kind	Lan Pg	Main IPC	Filing Notes
EP 772139	A2 E	19	G06F-017/30	
Designated States (Regional): CH DE GB LI				
US 6049804	A		G06F-017/30	Cont of application US 95551493 Cont of patent US 5727197
JP 9212528	A	17	G06F-017/30	
US 5727197	A	18	G06F-017/30	

Relational database storing method in different memory devices...

...by dividing database into data segments each corresponding to  
different range of values in selected database field, stores each  
data segment in different memory, each stored segments has stored  
index of corresponding data segment

...Abstract (Basic): The method divides the database into several data  
segments. Each data segment corresponds to a different range of  
values in a selected field of the database. Each data segment is  
stored in the different memory device. Each of the stored data  
segments has a segment index identifying the corresponding data  
segment, also stored...

...of the selected field is stored. Each entry of the range index  
identifies the segment index for the data segment corresponding to  
that range. The storage devices are organised so that recently created  
records...

...ADVANTAGE - Relates to field of storage and access of very large  
relational or object oriented databases. Segments and searches  
database obviating problems due to limitations of existing methods...

...Abstract (Equivalent): The method divides the database into several  
data segments. Each data segment corresponds to a different range  
of values in a selected field of the database. Each data segment is  
stored in the different memory device. Each of the stored data  
segments has a segment index identifying the corresponding data  
segment, also stored...

good

FOUR  
RELATED  
DOCUMENTS  
BENEATH

...of the selected field is stored. Each entry of the range index identifies the segment **index** for the **data** segment corresponding to that range. The storage devices are organised so that recently created records...

...ADVANTAGE - Relates to field of storage and access of very large relational or object oriented **databases** . Segments and searches **database** obviating problems due to limitations of existing methods...

...Title Terms: **DATABASE** ;

International Patent Class (Main): **G06F-017/30**

International Patent Class (Additional): **G06F-012/00**

Manual Codes (EPI/S-X): **T01-J05B4M**



US006049804A

# United States Patent [19]

Burgess et al.

[11] Patent Number: 6,049,804  
[45] Date of Patent: \*Apr. 11, 2000

## [54] METHOD AND APPARATUS FOR SEGMENTING A DATABASE

7-129450 5/1995 Japan  
2 207 264 1/1989 United Kingdom

[75] Inventors: John G. Burgess, Vienna, Va.; Randall E. Breeden, Gaithersburg, Md.

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[73] Assignee: FileTek, Inc., Rockville, Md.

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[\*] Notice: This patent is subject to a terminal disclaimer.

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[21] Appl. No.: 09/036,671

Feurstein, Kimball, "Introduction to the Red Brick Warehouse," 1994.

[22] Filed: Mar. 9, 1998

DEC DB Integrator, pp. 4-19 through 4-20; date unknown.

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DeWitt, et al., "GAMMA: A High Performance Dataflow Database Machine," Computer Sciences Technical Report #365, Mar. 1986, pp. 7-9.

[63] Continuation of application No. 08/551,493, Nov. 1, 1995, Pat. No. 5,727,197.

"Specialized Requirements for Relational Data Warehouse Servers," A Red Brick Systems White Paper, No date.

[51] Int. Cl.<sup>7</sup> ..... G06F 17/30

Database 2 MVS/ESA Version 4 DB2 for MVS/ESA: Administrative Guide III Draft, "Is Access Through a Partition Scan?" IBM Corp., 1994, 1995.

[52] U.S. Cl. .... 707/100; 707/1; 707/2; 707/200; 707/204

[58] Field of Search ..... 707/1, 2, 3, 5, 707/100, 200

Patent Abstracts of Japan, Kokai No. 5-334165, Vol. 18, No. 169, Dec. 17, 1993.

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Primary Examiner—Thomas G. Black

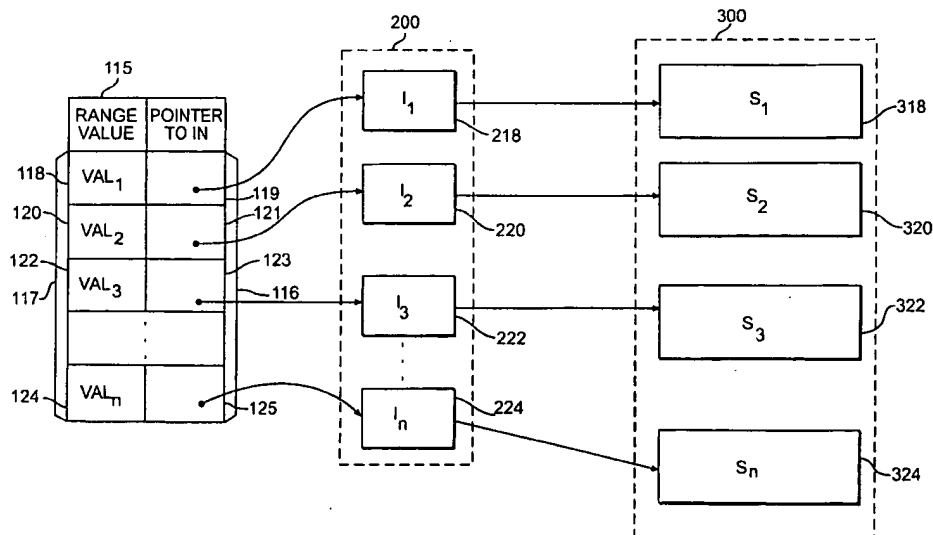
Assistant Examiner—Frantz Coby

Attorney, Agent, or Firm—Finnegan, Henderson, Farabow, Garrett & Dunner, L.L.P.

## [57] ABSTRACT

A relational database method and apparatus includes a database that is divided into multiple data segments, each of which may be independently stored on one of a variety of storage devices. As data from the relational database is being loaded, the number of data segments will increase. A range index is used as a high level filter to determine which indices and data segments will be used to process a query of the database.

35 Claims, 12 Drawing Sheets



complete data segment. If so, a segment index for the received data segment is generated and stored at step 1308. At step 1310, the database system checks if all the data segments have been received. If the data segments have not all been received, a new bit stream is started, step 1302. If the data segments have all been received, a range index is generated for the database, step 1312. One skilled in the art will recognize that this process may be used to append new segments or delete old segments and corresponding range index records.

FIG. 13 is a flow diagram showing the database record retrieval method of the preferred embodiment of the present invention. In this figure, step 1400 receives the database query. The range-value from the query is matched to the range index to obtain a reference to segment indices, step 1402. Each referenced segment index is accessed and matched against the query value, step 1404. If the query value matches the segment index in step 1406, the corresponding address(es) to record(s) in the data segment are retrieved, step 1408, and the data segment is accessed, step 1410. If in step 1406, the database system determines that the query value does not match the segment index, the method proceeds to step 1412. This step checks whether all the segment indices have been processed. If all the segment indices have been processed, the access is finished. If all the segment indices have not been processed, step 1406 again executes to determine if the query value matches the next segment index.

In summary, the present invention contemplates a database that may be stored in data segments across multiple storage devices and on multiple volumes within the same storage device. A high level range index is used to segment the database records into multiple storage devices. The range index is searched based on a range parameter chosen so that each data segment is stored on a storage device most suited to the accessing pattern of that segment. Typically, a time/date range parameter is used.

Matching the range parameter to the range index identifies one or more segment indices to be searched. Segment indices not identified do not have to be searched. Each segment index includes one or more indices for searching its corresponding data segment. The database system chooses the index within the segment index based on the type of query entered. A query for a range of records is typically searched with a value index, while a query for specific records is typically searched with a hash index.

It will be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing from the scope or spirit of the invention. As an example, multiple range indices may be used to access a data segment (e.g., date and serial number). As another example, the range index and/or the index segments may be implemented using a bitmap structure. As yet another example, instead of operating with a relational or standard database, the present invention may be used with an object oriented database by segmenting the objects in the object orientated database in the manner described in this disclosure based on the object attributes.

Other embodiments of the invention will be apparent to those skilled in the art from consideration of the specification and practice of the invention disclosed herein. It is intended that the specification and examples be considered as exemplary only, with the true scope and spirit of the invention being indicated by the following claims.

What is claimed is:

1. A method for storing at least a portion of a database in one or more memory devices, comprising the steps of:

storing the portion of the database as a plurality of data segments in said one or more memory devices, each said data segment corresponding to a different range of values in a selected field of the database;

storing for each of said data segments, at least one segment index identifying locations of index values within that data segment; and

storing a range index with entries corresponding to the ranges of the selected field, each of the entries of the range index identifying the segment index for the data segments corresponding to that range.

2. The method of claim 1, further comprising the steps of migrating placement of information corresponding to the database to the memory devices such that earlier created data segments are stored on slower and less expensive memory devices than recently created data segments.

3. The method of claim 1, further comprising the step of storing the segment indexes and the range index on memory devices which are faster than the memory devices storing the data segments.

4. The method of claim 1, further comprising the step of storing the segment index in a hash index format and a value index format.

5. A method of retrieving records from a database stored in a plurality of data segments, indexed by and corresponding to a segment index, the segment index being indexed by corresponding entries in a range index, the method comprising the steps of:

receiving a query including a range parameter and a query-value;

identifying a range-value of the range index from the range parameter to obtain a first reference to the segment index;

matching the query-value to the first reference to obtain a second reference to each said data segment that corresponds to the first reference; and

retrieving the records corresponding to the second reference in each said data segment that corresponds to the first reference.

6. The method of claim 5, wherein the retrieving step further comprises the step of retrieving the records from different data segments in parallel.

7. The method of claim 5, wherein the range parameter is a date, and wherein the step of identifying further comprises the step of identifying the range-value corresponding to a date range.

8. The method of claim 5, further comprising the step of retrieving records stored on different storage devices.

9. The method of claim 8, further comprising the step of organizing the storage devices such that recently created records are stored on faster storage devices than older records created prior to the recently created records.

10. The method of claim 5, wherein the step of receiving a query further comprises the step of allowing the database to be accessed and queried by a user as a single relational database.

11. The method of claim 5, further comprising the step of storing the segment indices on different storage devices than said corresponding data segments.

12. The method of claim 5, wherein the range further comprises the step of corresponding the range-value to a time range.

13. The method of claim 5, wherein the step of retrieving the records further includes the step of:  
hashing the second reference using a hash-mapping function; and

using the result of the hash-mapping function to index a hit-list pointing to the records that are to be retrieved.

14. The method of claim 13, wherein the step of hashing the second reference is performed with a two-code hash-mapping function.

15. A data storage and retrieval system for accessing elements of a relational database stored as a plurality of data segments, the system comprising:

a plurality of storage subsystems configured to store each of the plurality of data segments;

a plurality of segment indices for indexing elements of the data segments, each segment index corresponding to one of the plurality of data segments; and

a range index for indexing the plurality of segment indices based on a first parameter specifying a temporal range; wherein the elements of the relational database are retrieved using the range index to identify one or more of the segment indices to access based on the first parameter and for each segment index accessed, identifying the elements to retrieve based on a second parameter.

16. The system of claim 15, wherein the first and second parameters are contained within an SQL query of the relational database.

17. The system of claim 15, wherein the plurality of storage subsystems include a magnetic disk.

18. The data storage device of claim 15, wherein the segment indices each further comprise a hash index and a value index.

19. The system of claim 15, wherein the plurality of storage subsystems include an erasable optical disk.

20. The system of claim 15, wherein the plurality of storage subsystems include a WORM optical disk.

21. The system of claim 15, wherein the plurality of storage subsystems include an automated tape storage.

22. A data storage and retrieval system for accessing elements of a relational database stored in a plurality of data segments, the system comprising:

storage subsystems configured to store each of the plurality of data segments;

a plurality of segment indices for indexing elements of the data segments, each segment index corresponding to one of the plurality of data segments; and

a range index for indexing the plurality of segment indices based on a first parameter specifying a range;

wherein the elements of the relational database are retrieved using the range index to identify one or more of the segment indices to access based on the first parameter and for each segment index accessed, identifying the elements to retrieve based on a second parameter.

23. The system of claim 22, wherein the storage subsystems include tape storage.

24. The system of claim 22, further comprising a receiving subsystem configured to receive the first parameter and the second parameter, the receiving subsystem being linked to multiple computer platforms.

25. The system of claim 22, wherein the plurality of data segments and index segments are stored on different volumes of the storage means.

26. The data storage device of claim 22, wherein the segment indices each further comprise a hash index and a value index.

27. A method of modifying an existing database stored on one or more memory devices, comprising the steps of:

updating a data segment of the database on the one or more memory devices;

generating a segment index corresponding to the updated data segment, the segment index for indexing data of the data segment;

updating a range index of the database to reflect the generated segment index, the range index for indexing a plurality of segment indices, the plurality of segment indices including the generated segment index.

28. The method of claim 27, wherein the step of updating a data segment further comprises storing an input data stream as a data segment on the one or more memory devices.

29. The method of claim 28, wherein the step of updating a data segment further comprises deleting a data segment on the one or more memory devices.

30. The method of claim 27, wherein the step of generating the segment index further includes the step of generating the segment index as an aggregation of a hash index and a value index.

31. A memory for storing data for access by a program being executed on a computer processing system, comprising:

a data structure stored in said memory, said data structure including information resident in a database used by said program and including:

a plurality of data segments each storing a portion of a relational database;

a plurality of segment indices corresponding to the plurality of data segments, respectively; and

a range index corresponding to the plurality of segment indices.

32. A computer readable medium containing instructions for causing a computer to store at least a portion of a database in one or more memory devices, the instructions causing the computer to:

store the portion of the database as a plurality of data segments in said one or more memory devices, each said data segment corresponding to a different range of values in a selected field of the database;

store for each of said data segments, at least one segment index identifying locations of index values within that data segment; and

store a range index with entries corresponding to the ranges of the selected field, each of the entries of the range index identifying the segment index for the data segments corresponding to that range.

33. A processor associated with a memory including instructions that, when executed, cause the processor to:

store a portion of a database in one or more memory devices as a plurality of data segments in said one or more memory devices, each said data segment corresponding to a different range of values in a selected field of the database;

store for each of said data segments, at least one segment index identifying locations of index values within that data segment; and

store a range index with entries corresponding to the ranges of the selected field, each of the entries of the range index identifying the segment index for the data segments corresponding to that range.

34. A computer readable medium containing instructions for causing a computer to retrieve records from a database stored in a plurality of data segments, indexed by and corresponding to a segment index, the segment index being indexed by corresponding entries in a range index, the instructions causing the computer to perform, in response to receiving a query including a range parameter and a queryvalue, the steps of:

## 11

identifying a range-value of the range index from the range parameter to obtain a first reference to the segment index;

matching the query-value to the first reference to obtain a second reference to each said data segment that corresponds to the first reference; and

retrieving the records corresponding to the second reference in each said data segment that corresponds to the first reference.

35. A processor having a memory including instructions that, when executed, cause the processor to retrieve records from a database stored in a plurality of data segments, indexed by and corresponding to a segment index, the segment index being indexed by corresponding entries in a

## 12

range index, the processor performing, in response to receiving a query including a range parameter and a query-value, the steps of:

identifying a range-value of the range index from the range parameter to obtain a first reference to the segment index;

matching the query-value to the first reference to obtain a second reference to each said data segment that corresponds to the first reference; and

retrieving the records corresponding to the second reference in each said data segment that corresponds to the first reference.

\* \* \* \* \*

4



20/3,K/46 (Item 45 from file: 350)  
DIALOG(R) File 350:Derwent WPIX  
(c) 2005 Thomson Derwent. All rts. reserv.

010590453 \*\*Image available\*\*  
WPI Acc No: 1996-087406/199609  
XRPX Acc No: N96-073345

Concurrent control method for database management system with design  
and execution phases - acquiring IX lock mode on range by replacing  
update, insert and delete operation with three separate associated lock  
modes and expands mode set so each mode represents different  
combination of range and key value locks

Patent Assignee: DIGITAL EQUIP CORP (DIGI )  
Inventor: GREEN R J; LOMET D B  
Number of Countries: 001 Number of Patents: 001  
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 5485607	A	19960116	US 9314188	A	19930205	199609 B

Priority Applications (No Type Date): US 9314188 A 19930205

Patent Details:

Patent No	Kind	Lan Pg	Main IPC	Filing Notes
US 5485607	A	28	G06F-017/30	

Concurrent control method for database management system with design  
and execution phases...

...operation with three separate associated lock modes and expands mode set  
so each mode represents different combination of range and key  
value locks

...Abstract (Basic): are compatible with each other. The lock manager  
maintains a lock table that identifies locked **database** resources and  
the composite lock modes in which they are locked. The lock manager  
receives...

...the compatibility matrix with the lock modes of locks acquired by other  
transactions on the **database** resources that the lock requests  
designate. A number of transaction routines are executed for performing  
respective transactions. Each transaction routine has instructions that  
implement **database** -access operations, associated with respective  
**database** accesses, that apply lock requests to the lock manager...

...The instructs are executed to perform the associated **database** accesses  
only if the compatibility indications generated by the lock manager in  
response to the...

...that to which the resource of the first type associated with it is  
mapped. The **database** -access operations implemented by the  
instructions of the number of transaction routines includes a set...

...Title Terms: **DATABASE** ;

International Patent Class (Main): **G06F-017/30**

Manual Codes (EPI/S-X): **T01-J05B** ...

... **T01-S**

20/3,K/48 (Item 47 from file: 350)  
DIALOG(R)File 350:Derwent WPIX  
(c) 2005 Thomson Derwent. All rts. reserv.

010483586 \*\*Image available\*\*  
WPI Acc No: 1995-384906/199550

**Integrated database structure for information management system -  
combines two data base management system which respond to different  
data base into single information management system by providing  
corresponding data entry terminal equipment**

Patent Assignee: HITACHI CHO LSI ENG KK (HISC ); HITACHI LTD (HITA )

Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
JP 7230474	A	19950829	JP 9420557	A	19940217	199550 B

Priority Applications (No Type Date): JP 9420557 A 19940217

Patent Details:

Patent No	Kind	Lan Pg	Main IPC	Filing Notes
JP 7230474	A	6	G06F-017/30	

**Integrated database structure for information management system...**

**...combines two data base management system which respond to different  
data base into single information management system by providing  
corresponding data entry terminal equipment**

...Abstract (Basic): The data base structure is obtained by combining  
two DBMS (3,4) of different data bases namely a ISADB (1) which  
makes a real time process possible and a RDB (2...

...A data reference terminal equipment (6) which requires un specified and  
complicated access type data appropriate to reference processes such  
as quality management is provided for the RDB...

...Title Terms: DATABASE ;

International Patent Class (Main): G06F-017/30

International Patent Class (Additional): G06F-012/00

Manual Codes (EPI/S-X): T01-J05B4 ...

... T01-J07B



US005727197A

**United States Patent** [19]**Burgess et al.**[11] **Patent Number:** **5,727,197**[45] **Date of Patent:** **Mar. 10, 1998**[54] **METHOD AND APPARATUS FOR SEGMENTING A DATABASE**[75] Inventors: **John G. Burgess**, Vienna, Va.; **Randall E. Breeden**, Gaithersburg, Md.[73] Assignee: **FileTek, Inc.**, Rockville, Md.[21] Appl. No.: **551,493**[22] Filed: **Nov. 1, 1995**[51] Int. Cl.<sup>6</sup> ..... **G06F 17/30**[52] U.S. Cl. .... **395/602; 395/601; 395/611; 395/616; 395/620**[58] Field of Search ..... **395/603, 605, 395/606, 440, 497.01, 601, 602, 611, 616, 620; 371/404; 364/400**[56] **References Cited****U.S. PATENT DOCUMENTS**

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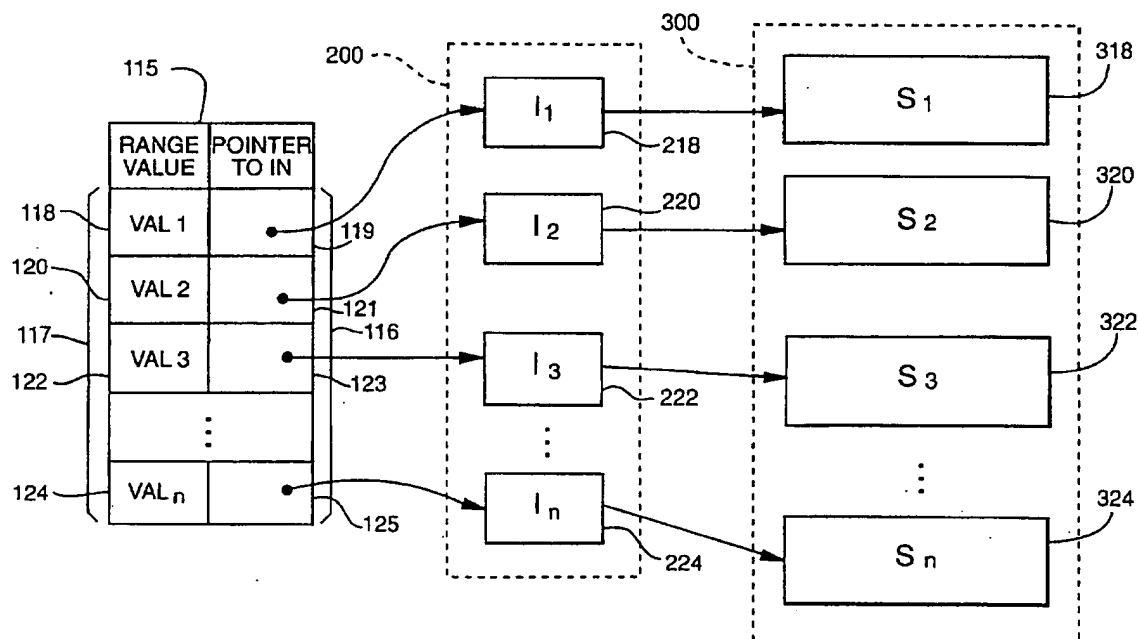
*Primary Examiner*—Thomas G. Black

*Assistant Examiner*—Frantz Coby

*Attorney, Agent, or Firm*—Finnegan, Henderson, Farabow, Garrett & Dunner, L.L.P.

[57] **ABSTRACT**

A relational database method and apparatus includes a database that is divided into multiple data segments, each of which may be independently stored on one of a variety of storage devices. As data from the relational database is being loaded, the number of data segments will increase. A range index is used as a high level filter to determine which indices and data segments will be used to process a query of the database.

**20 Claims, 12 Drawing Sheets**

At step 1310, the database system checks if all the data segments have been received. If the data segments have not all been received, a new bit stream is started, step 1302. If the data segments have all been received, a range index is generated for the database, step 1312. One skilled in the art will recognize that this process may be used to append new segments or delete old segments and corresponding range index records.

FIG. 13 is a flow diagram showing the database record retrieval method of the preferred embodiment of the present invention. In this figure, step 1400 receives the database query. The range-value from the query is matched to the range index to obtain a reference to segment indices, step 1402. Each referenced segment index is accessed and matched against the query value, step 1404. If the query value matches the segment index in step 1406, the corresponding address(es) to record(s) in the data segment are retrieved, step 1408, and the data segment is accessed, step 1410. If in step 1406, the database system determines that the query value does not match the segment index, the method proceeds to step 1412. This step checks whether all the segment indices have been processed. If all the segment indices have been processed, the access is finished. If all the segment indices have not been processed, step 1406 again executes to determine if the query value matches the next segment index.

In summary, the present invention contemplates a database that may be stored in data segments across multiple storage devices and on multiple volumes within the same storage device. A high level range index is used to segment the database records into multiple storage devices. The range index is searched based on a range parameter chosen so that each data segment is stored on a storage device most suited to the accessing pattern of that segment. Typically, a time/date range parameter is used.

Matching the range parameter to the range index identifies one or more segment indices to be searched. Segment indices not identified do not have to be searched. Each segment index includes one or more indices for searching its corresponding data segment. The database system chooses the index within the segment index based on the type of query entered. A query for a range of records is typically searched with a value index, while a query for specific records is typically searched with a hash index.

It will be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing from the scope or spirit of the invention. As an example, multiple range indices may be used to access a data segment (e.g., date and serial number). As another example, the range index and/or the index segments may be implemented using a bitmap structure. As yet another example, instead of operating with a relational or standard database, the present invention may be used with an object oriented database by segmenting the objects in the object orientated database in the manner described in this disclosure based on the object attributes.

Other embodiments of the invention will be apparent to those skilled in the art from consideration of the specification and practice of the invention disclosed herein. It is intended that the specification and examples be considered as exemplary only, with the true scope and spirit of the invention being indicated by the following claims.

What is claimed is:

1. A method for storing at least a portion of a database in one or more memory devices, comprising the steps of:

dividing the portion of the database into a plurality of data segments each said data segment corresponding to a different range of values in a selected field of the database;

storing each of said data segments in said one or more memory devices;

storing for each of said stored data segments, a segment index identifying the corresponding data segment; and

storing a range index with entries corresponding to the ranges of the selected field, each of the entries of the range index identifying the one of the segment index for the data segments corresponding to that range.

2. The method of claim 1, further comprising the step of organizing the storage devices such that recently created records are stored on faster storage devices than older records created prior to the recently created records.

3. A method of retrieving records from a database divided into a plurality of data segments, indexed by and corresponding to at least one segment index indexed by corresponding entries in a range index, the method comprising the steps of:

receiving a query including at least one range parameter and at least one query-value;

identifying a range-value of the range index from the received range parameter to obtain a first reference to at least one of the segment indices;

matching the query-value to the first referenced segment indices to obtain a second reference to each said data segment that corresponds to the segment indices referenced by the first reference; and

retrieving the records corresponding to the second reference in each said data segment that corresponds to the segment indices referenced by the first reference.

4. The method of claim 3, wherein the retrieving step further comprises the step of retrieving the records from different data segments in parallel.

5. The method of claim 3, wherein the range parameter is a date, and wherein the step of identifying further comprises the step of identifying the range-value corresponding to a date range.

6. The method of claim 3, further comprising the step of retrieving records stored on different storage devices.

7. The method of claim 6, further comprising the step of organizing the storage devices such that recently created records are stored on faster storage devices than older records created prior to the recently created records.

8. The method of claim 3, wherein the step of receiving a query further comprises the step of allowing the database to be accessed and queried by a user as a single relational database.

9. The method of claim 3, further comprising the step of storing the segment indices on different storage devices than said corresponding data segments.

10. The method of claim 3, wherein the range further comprises the step of corresponding the range-value to a time range.

11. A data storage and retrieval system for accessing elements of a relational database divided into a plurality of data segments, the system comprising:

a plurality of storage means for respectively storing each of the plurality of data segments;

a plurality of segment indices for indexing elements of the data segments, each segment index corresponding to one of the plurality of data segments; and

a range index for indexing the plurality of segment indices based on a first parameter specifying a temporal range; wherein the elements of the relational database are retrieved using the range index to identify one or more of the segment indices to access based on the first

parameter and for each segment index accessed, identifying the elements to retrieve based on a second parameter.

12. The system of claim 11, wherein the first and second parameters are contained within an SQL query of the relational database.

13. The system of claim 11, wherein the plurality of storage means are at least one of: magnetic disk, erasable optical disk, WORM optical disk, and automated tape storage.

14. A data storage and retrieval system for accessing elements of a relational database divided into a plurality of data segments, the system comprising:

storage means for respectively storing each of the plurality of data segments;

a plurality of segment indices for indexing elements of the data segments, each segment index corresponding to one of the plurality of data segments; and

a range index for indexing the plurality of segment indices based on a first parameter specifying a range;

wherein the elements of the relational database are retrieved using the range index to identify one or more of the segment indices to access based on the first parameter and for each segment index accessed, identifying the elements to retrieve based on a second parameter.

15. The system of claim 14, wherein the storage means is automated tape storage.

16. The system of claim 14, further comprising means for receiving the first parameter and the second parameter, the means for receiving being linked to multiple computer platforms.

17. The system of claim 14, wherein the plurality of data segments are stored on different volumes of the storage means.

18. A method of modifying an existing database stored on one or more memory devices, comprising the steps of:

updating a data segment of the database on the one or more memory devices;

generating a segment index corresponding to the updated data segment, the segment index for indexing data of the data segment;

updating a range index of the database to reflect the generated segment index, the range index for indexing a plurality of segment indices, the plurality of segment indices including the generated segment index.

19. The method of claim 18, wherein the step of updating a data segment further comprises storing an input data stream as a data segment on the one or more memory devices.

20. The method of claim 19, wherein the step of updating a data segment further comprises deleting a data segment on the one or more memory devices.

\* \* \* \* \*

Set	Items	Description
S1	846974	DATABASE? OR DATA()BASE? OR DATATABLE? OR DATA()TABLE? OR - DASD OR DATA?(3N)(INDEX? OR INDICES OR ROW OR ROWS OR RECORD? OR FILE? OR PAGESET? OR PAGE() (SET OR SETS)) OR DBMS
S2	18295	(ROW OR ROWS OR TABLE? OR INDEX? OR INDICES OR ROWSET? OR - ROW() (SET OR SETS)) (10N) (FILEOBJECT? OR FILE()OBJECT? OR OBJE- CT?)
S3	981815	(KEYVALUE? OR KEY()VALUE? OR VALUE? OR CHARACTERISTIC? OR - ATTRIBUT? OR QUALIT?) (10N) (RANGE? OR SPECTR? OR TYPE? OR SCOP- E? OR PARAMET?)
S4	247226	(DESIGNAT? OR ASSIGN? OR DISTRIBUT? OR ALLOCAT? OR FORMAT? OR DIVY? OR DISPENS? OR ALLOT? OR REORGANI? OR RE()ORGANI? OR STORE? OR STORING?) (7N) (SPACE? OR AREA? OR SEGMENT? OR SECTIO- N? OR SECTOR? OR TABLESPACE? OR FREESPACE?)
S5	7692271	DIFFERENT? OR NONUNIFORM? OR (NON OR "NOT") () (EVEN?? OR UN- IFORM? OR ALIKE SIMILAR) OR DISSIMILAR? OR DISIMILAR? OR INCO- NSISTENT? OR HETER? OR UNEVEN? OR NONSIMILAR? OR NONIDENTIC?
S6	123801	S1:S2 AND S4:S5
S7	738	S6 AND S1 AND S2
S8	42	S7 AND S3
S9	386	S6 AND S4(10N)S5
S10	2	S9 AND S7
S11	15	S9 AND S3
S12	28	S9 AND S5/TI
S13	84	S8 OR S10:S12
S14	2	S7 AND S9
S15	84	S13:S14
S16	73	S15 AND PY<2002
S17	56	RD (unique items)

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S2	18295	(ROW OR ROWS OR TABLE? OR INDEX? OR INDICES OR ROWSET? OR - ROW() (SET OR SETS)) (10N) (FILEOBJECT? OR FILE()OBJECT? OR OBJE- CT?)
S3	981815	(KEYVALUE? OR KEY()VALUE? OR VALUE? OR CHARACTERISTIC? OR - ATTRIBUT? OR QUALIT?) (10N) (RANGE? OR SPECTR? OR TYPE? OR SCOP- E? OR PARAMET?)
S4	247226	(DESIGNAT? OR ASSIGN? OR DISTRIBUT? OR ALLOCAT? OR FORMAT? OR DIVY? OR DISPENS? OR ALLOT? OR REORGANI? OR RE()ORGANI? OR STORE? OR STORING?) (7N) (SPACE? OR AREA? OR SEGMENT? OR SECTIO- N? OR SECTOR? OR TABLESPACE? OR FREESPACE?)
S5	7692271	DIFFERENT? OR NONUNIFORM? OR (NON OR "NOT") () (EVEN?? OR UN- IFORM? OR ALIKE SIMILAR) OR DISSIMILAR? OR DISIMILAR? OR INCO- NSISTENT? OR HETER? OR UNEVEN? OR NONSIMILAR? OR NONIDENTIC?
S6	123801	S1:S2 AND S4:S5
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S8	42	S7 AND S3
S9	386	S6 AND S4 (10N) S5
S10	2	S9 AND S7
S11	15	S9 AND S3
S12	28	S9 AND S5/TI
S13	84	S8 OR S10:S12
S14	2	S7 AND S9
S15	84	S13:S14
S16	73	S15 AND PY<2002
S17	56	RD (unique items)
S18	312	S4(7N)S5 AND S1
S19	11	S18 AND S2:S3
S20	8	S18 AND (S1:S3 AND S5)/TI
S21	19	S19:S20
S22	0	S21 NOT S15

*SUPPLEMENTAL  
STRATEGY*

17/3,K/13 (Item 13 from file: 2)

DIALOG(R)File 2:INSPEC

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4619426 INSPEC Abstract Number: C9404-6160Z-014

**Title: A universal-scheme approach to statistical databases containing homogeneous summary tables**

Author(s): Malvestuto, F.M.

Author Affiliation: Dept. of Electr. Eng., L'Aquila Univ., Italy

Journal: ACM Transactions on Database Systems vol.18, no.4 p. 678-708

Publication Date: Dec. 1993 Country of Publication: USA

CODEN: ATDSD3 ISSN: 0362-5915

U.S. Copyright Clearance Center Code: 0362-5915/93/1200-0678\$03.50

Language: English

Subfile: C

**Title: A universal-scheme approach to statistical databases containing homogeneous summary tables**

Abstract: In many situations a statistical **database** contains multiple summary tables, which report summary statistics on the same summary variable for the same population of individuals or **objects** using **different** classification criteria ("homogeneous" summary tables). Existing query languages consider only those queries which may aggregate data stored in a single summary table. When a statistical **database** contains homogeneous summary tables, such query languages do not allow an integrated view of data...

... search for a universal-scheme solution to the problem of data integration is such statistical **databases**. It is shown that such a solution can be found if the **database** tables contain additive summary data. Accordingly, queries are grouped into three classes: queries that can be evaluated to single **values** (evaluable queries); queries that can be evaluated to **value ranges** (answerable queries); and queries whose **values** remain unknown (unanswerable queries). The membership of a given query to one of these three...

... the summary variable and the dependencies that are assumed in the universal scheme by the **database** designer. On the basis of such information, linear-time procedures for recognizing and answering answerable...

Descriptors: **database** management systems...

...Identifiers: statistical **databases** ;

1993



17/3,K/25 (Item 1 from file: 8)  
DIALOG(R)File 8: Ei Compendex(R)  
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05625250 E.I. No: EIP00085290328

**Title:** Distributed similarity search algorithm in distributed heterogeneous multimedia databases

**Author:** Lee, Ju-Hong; Kim, Deok-Hwan; Lee, Seok-Lyong; Chung, Chin-Wan; Cha, Guang-Ho

**Corporate Source:** Korea Advanced Inst of Science and Technology, Taejon, South Korea

**Source:** Information Processing Letters v 75 n 1 Jul 2000. p 35-42

**Publication Year:** 2000

**CODEN:** IFPLAT **ISSN:** 0020-0190

**Language:** English

**Title:** Distributed similarity search algorithm in distributed heterogeneous multimedia databases

**Abstract:** The collection fusion problem in multimedia databases is concerned with the merging of results retrieved by content based retrieval from distributed heterogeneous multimedia databases in order to find the most similar objects to a query object. We propose distributed...

...solve this problem. To our knowledge, these algorithms are the first research results in the area of distributed content based retrieval for heterogeneous multimedia databases. (Author abstract) 10 Refs.

**Descriptors:** \*Distributed database systems; Multimedia systems; Algorithms; Online searching; Distributed computer systems; Regression analysis; Heuristic methods

17/3,K/29 (Item 5 from file: 8)  
DIALOG(R)File 8: Ei Compendex(R)  
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02689572 E.I. Monthly No: EIM8812-062714

**Title: DISTRIBUTING A DATABASE ACROSS A NETWORK OF DIFFERENT DATABASE SYSTEMS.**

Author: Oxborrow, E. A.

Corporate Source: Univ of Kent at Canterbury, Engl

Conference Title: Colloquium on Distributed Database Systems.

Conference Location: London, Engl Conference Date: 19870413

E.I. Conference No.: 11360

Source: IEE Colloquium (Digest) n 1987/46. Publ by IEE, London, Engl p 5.  
1-5. 7

Publication Year: 1987

CODEN: DCILDN

Language: English

**Title: DISTRIBUTING A DATABASE ACROSS A NETWORK OF DIFFERENT DATABASE SYSTEMS.**

Abstract: This paper considers various aspects of the design and development of **heterogeneous distributed database** systems. In the next section, **heterogeneous** systems will be put in context and compared briefly with other distributed **database** systems. Typical architecture for a **heterogeneous** system will then be considered. Following this, the main features of the Proteus system will be discussed. Finally, an attempt will be made to answer the question: 'Are **heterogeneous distributed database** systems feasible? '. 9 refs.

Descriptors: \*DATABAS E SYSTEMS...

Identifiers: **HETEROGENEOUS DISTRIBUTED DATABASE SYSTEM; PROTEUS DATABASE SYSTEM; DATABASE ARCHITECTURE**

17/3,K/39 (Item 3 from file: 35)  
DIALOG(R)File 35:Dissertation Abs Online  
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01686293 ORDER NO: AAD99-16451

**USING CONSTRAINT-BASED HEURISTICS TO SATISFICE STATIC SOFTWARE PARTITIONING  
AND ALLOCATION OF HETEROGENEOUS DISTRIBUTED SYSTEMS ( DATABASE  
SEGMENTATION )**

Author: SISLEY, ELIZABETH MARIE

Degree: PH.D.

Year: 1999

Corporate Source/Institution: UNIVERSITY OF MINNESOTA (0130)

Source: VOLUME 60/01-B OF DISSERTATION ABSTRACTS INTERNATIONAL.

PAGE 262. 80 PAGES

**USING CONSTRAINT-BASED HEURISTICS TO SATISFICE STATIC SOFTWARE PARTITIONING  
AND ALLOCATION OF HETEROGENEOUS DISTRIBUTED SYSTEMS ( DATABASE  
SEGMENTATION )**

Year: 1999

When developing **heterogeneous** distributed systems, there are architectural choices that determine: (1) which software and data entities must...

...the directional flow of data. A key concept shows how to interleave the decisions of **database segmentation** and software **distribution**. This approach is demonstrated with a simplified example of a real distributed system.

Applicable types of systems include dedicated, near-real-time software systems that run in **heterogeneous**, distributed hardware suites, such as: (1) peer-to-peer architectures; (2) client/server systems with UI, **database**, & computational functionality; (3) distributed robotics systems; and (4) distributed agents.

The benefits of this...

17/3,K/48 (Item 1 from file: 99)  
DIALOG(R)File 99:Wilson Appl. Sci & Tech Abs  
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1570262 H.W. WILSON RECORD NUMBER: BAST96065261  
**Production- heterogeneity index ranking**  
Journal of Petroleum Technology v. 48 (Oct. '96) p. 946-7  
DOCUMENT TYPE: Feature Article ISSN: 0149-2136

**Production- heterogeneity index ranking**

ABSTRACT: The writer demonstrates how **heterogeneity** indexing can be useful in the determination of optimum completion practices in specific **areas** and **formations** and as a surveillance tool for primary and secondary recovery operations. **Heterogeneity indexing** is a production-**data** analysis method that assesses completion efficiency by quantifying well-performance anomalies. The effectiveness of **different** completion techniques can be ranked for specific producing **formations** in a given geographical **area**. **Heterogeneity** signatures and indices may be extracted from time-based production data by use of computer-aided normalization methods. **Type** -curve signatures show **characteristics** relating to completion efficiency and properties.

1996